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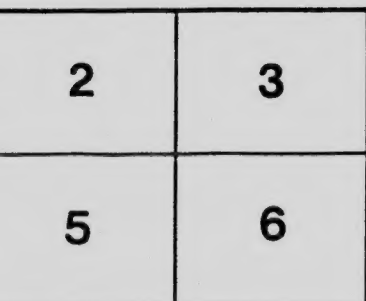
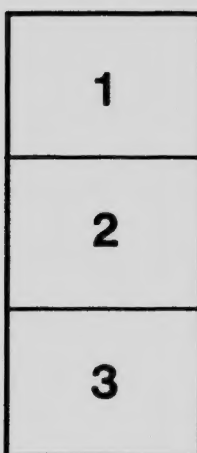
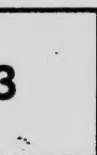
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Ontario Agricultural College and Experimental Farm

THE PRESENT CONDITION OF THE SAN JOSE SCALE IN ONTARIO.

BY WM. LOCHHEAD, B.A., M.S., PROFESSOR OF BIOLOGY AND GEOLOGY.

It is now nearly ten years since the San Jose scale made its appearance in the United States east of the Rockies, and it is about seven years since it first appeared in Ontario. It has made progress in that time in spite of all the efforts which have been put forth to keep it under control. In the St. Catharines district there are but few orchards which have escaped invasion, and many have succumbed to the terrible attack. In the West the scale is very prevalent in South Essex and Kent. Although the scale is so widespread in these districts, yet we must remember that if it had not been for the energetic action of the Government in appointing inspectors, and in passing the Fumigation Act for the treatment of nursery stock, in my judgment, the scale would have spread to most parts of the Province.

Never before has the San Jose scale problem seemed so easy of solution as it does to-day. After long experimentation we now know that we have methods which are both effective and easy to apply. The whole solution of the difficulty lies now with the fruit grower himself. There are five more or less effective remedies—first, the lime, sulphur, and salt mixture; second, crude petroleum; third, crude petroleum and whale-oil soap emulsion; fourth, whale-oil soap solution; fifth, the McBain Carbolic Wash. With regard to the lime, sulphur, and salt mixture, its effectiveness was demonstrated beyond doubt by Mr. G. E. Fisher, and it is being extensively used, in the West particularly, as an effective remedy. The chief points of excellence of this mixture are: First, its cheapness; second, its effectiveness; third, its cleansing effect upon the tree from both insect and fungous pests. The fact that it is somewhat difficult to prepare and hard on the men and apparatus, has made this mixture unpopular with some of our fruit growers. Where the fruit grower has the proper appliances for making the mixture its operation is not so difficult as it appears.

The crude petroleum is well adapted in the West for apple treatment, and in the Chatham district I fail to hear of the death of a single tree. In that district the oil is easy to procure and the fruit growers are well pleased with the results. The objections which have been urged against crude petroleum are: (1) The great variation in strength of the oil; (2) The disagreeableness of application, and (3) The great liability of its injuring plums and peaches.

The emulsion of crude petroleum and whale-oil soap, although a very effective remedy, has never taken well with the fruit growers, on account of the difficulty which was found in making the emulsion, and of the disagreeableness of the application.

Whale oil soap solution, although quite effective when properly applied, proved too expensive for the average orchard, and has been given up.

The McBain Carbolic Wash is a new insecticide which has been tried for the first time in Canada this summer and has given good satisfaction where it has been tried. Further experiments are necessary, however, to determine if the winter applications of the Carbolic Wash will prove as successful as summer applications.



W. W. Hilborn's appliance for making the lime-sulphur-salt mixture.

The lime, sulphur, and salt treatment, which the Essex fruit growers are using quite freely, is extremely cheap. Mr. J. D. Wigle, of Kingsville, tells me that it cost him but ten dollars for outside help to spray forty apple trees and eight hundred peach trees with this mixture. Mr. W. W. Hilborn, of Leamington, is also quite enthusiastic over the mixture. He had some hesitation last spring in using it, but when he came to prepare it he found it much simpler than he had expected. He used a boiler, which he procured for ten dollars, to supply the steam for boiling the mixture. He used the 15, 15, 10 formula. The lime he slaked slowly in a coal-oil barrel with four gallons of water; then the sifted sulphur was added with stirring to the hot mixture.

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and the whole boiled for an hour; then the salt was added and the mixture boiled for half an hour longer. Mr. Hilborn kept a second barrel of hot water always convenient. This mixture was very effective, and I failed to find a single scale at the time of my visit, August 27th. It was applied also against the Scurfy Bark Louse and the Oyster Shell Bark Louse, and the results were extremely satisfactory. The Township of Gosfield, in which Kingsville is situated, passed a by law last spring compelling treatment of infested orchards, and a township sprayer, Mr. H. Bruner, was appointed to do the work whenever the owner himself cared not to spray. The results were quite satisfactory to most of the fruit growers, and they now see the solution of this problem of the San Jose scale.

In the St. Catharines district, however, the lime, sulphur, and salt treatment has not become popular, but no one seems to doubt its effectiveness against the scale.



PLATE 1. The Kottmeier orchard of about 400 plum-trees at St. Catharines treated with the McBain Carbolic Wash. (Pho. Aug. 14, 1903).

Mr. G. A. McBain has had a very interesting experiment under way, testing the effectiveness of his "Carbolic Wash" (Plate 1.). He undertook to clean up the Henry Kottmeier orchard, which contains about four hundred trees, mostly plums of five years' growth. Mr. McBain has given the orchard three applications. The first was made with his winter wash on the 28th and 29th of April, the second with his summer wash on the 14th and 15th of



PLATE 2. A peach orchard near St. Catharines practically destroyed by the San Jose Scale, containing 10,000 trees, now neglected and left untreated. (Photo. Aug. 14, 1903.)

July, and the third with the summer wash on the 14th and 15th of August. The winter application, although fairly satisfactory, did not kill all the scale, but as large a percentage as one could naturally expect from the encrusted condition of the trees. Besides, Mr. McBain tells me that he could now guarantee a much larger percentage of scale killed, because he was afraid to use a stronger formula than the one he had been using in California. I examined the orchard on the 14th of August, before the third application, and found but few scale on the trees. The trees looked healthy and had made a decided growth. Some of the leaves of the trees had been singed by the summer mixture, but I think no appreciable damage would be done.

There are two preparations made by Mr. McBain under the name of Carbolic Wash—the Winter and the Summer preparations. The Winter Wash was used in the first spraying operations and against the aphid. The Summer Wash is, in my judgment, the more effective scale remedy. It is not so black and does not contain so much crude carbolic acid as the winter wash. It remains to be seen how effective the Summer wash will be when applied in the winter, as Mr. McBain intends doing in future.

The McBain Carbolic Wash has been in use for some years in California as a scale remedy. It is a black, oily liquid, and smells strongly of crude carbolic acid. Other ingredients are pine tar and fish oil. The strong point in favor of this wash is the readiness and ease with which the spraying liquid can be prepared. When a barrel of liquid is to be made up, two or three gallons of the black carbolic wash are placed in the barrel and cold water added. The wash dissolves very readily, and the barrel of liquid has a milky appearance. Another feature of the preparation is that its application by the spray pump is not an unpleasant operation. The operator does not need a special suit of old clothes; as he would if he were spraying crude petroleum, whale-oil soap, or the lime, sulphur and salt mixture.

In my judgment the points of the McBain Carbolic Wash which I have indicated are very important in future operations against the San Jose Scale, for experience proves that the ordinary fruit grower is influenced mightily by the character of the spraying operation. I believe that the main reason why the crude petroleum, and the other preparations which are effective against the scale, did not take with the people was this very factor—the disagreeable nature of the spraying. As we all know, a perfect insecticide must possess the following qualities:—

1. It must be effective against the insect; 2. It must not harm the plant;
3. It must be readily and easily applied; 4. It must be cheap.

From my observations this McBain Carbolic Wash possesses at least three of these qualities, and it may have the fourth also, for I do not know what the retail price of it will be. This is an important point, but if the manufacture of the substance is to be made a business matter, then I have not much fear on this point.

In addition there is ground for the belief that this wash is valuable not only for controlling the aphid of apple, plum and cherry, but also as a fungicide for peach-leaf curl, apple scab, and the brown rot of plum, when used at the rate of 1 to 30.



PLATE 3. A large apple orchard near Kingsville very badly encrusted with San Jose Scale. The township sprayer is in the center of the orchard himself, or to allow the township sprayer to do the work.

PLATE 3. A large apple orchard near Kingsville very badly encrusted with San Jose Scale. The owner refused to treat the orchard himself, or to allow the township sprayer to do it for him. This orchard is now a menace to the neighboring ones. (Photo, Aug. 27, 1903.)

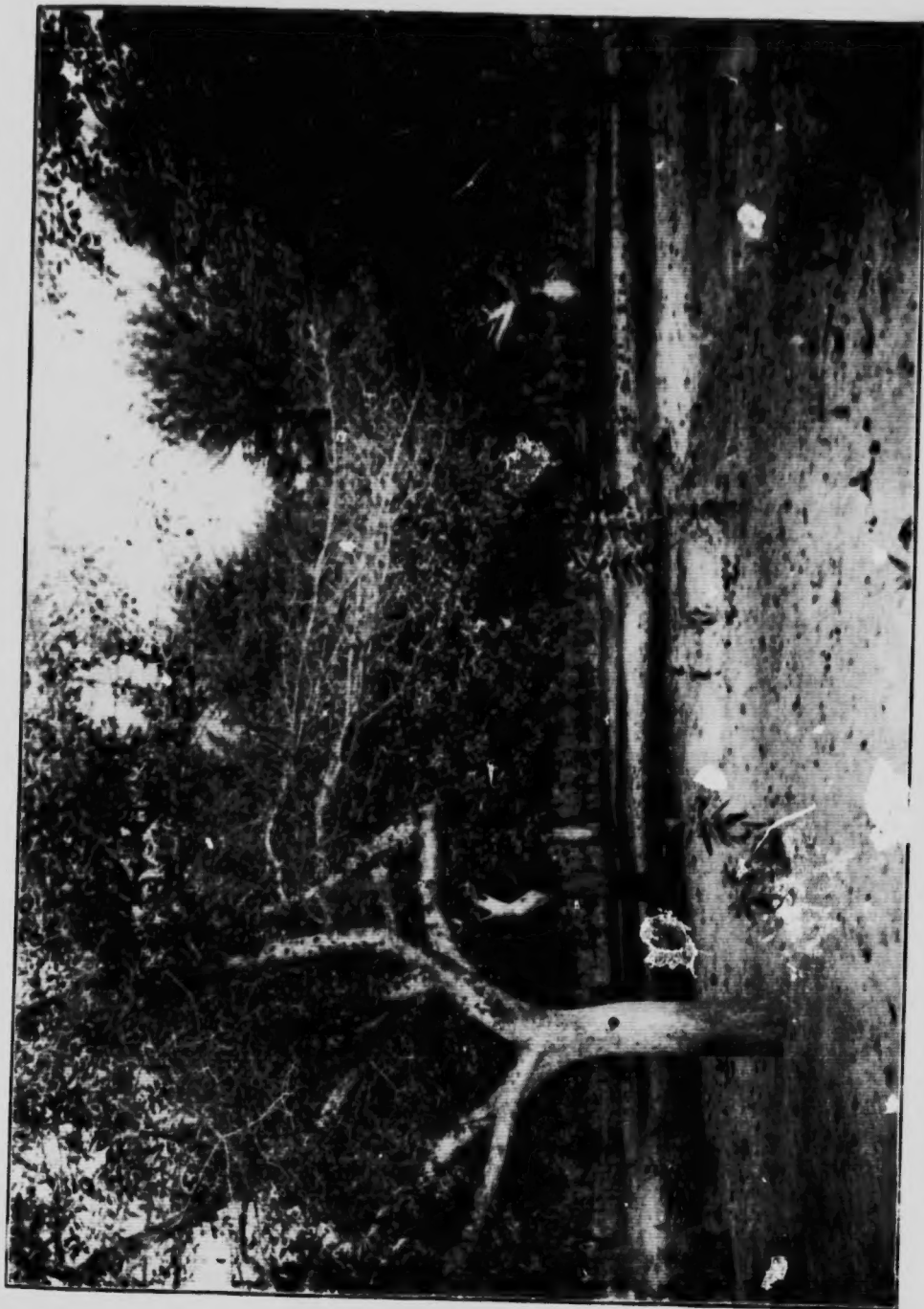


PLATE 4. An apple orchard belonging to John D. Wight, Kingsville, sprayed with lime, sulphur and salt in early spring. Very few scales could be found at time of visit. (Aug. 27, 1903.)

Now as to the future of the San Jose Scale. I do not advocate that the Provincial Government should continue to lay out large sums of money every year in fighting the scale. They might with just as good reason be asked to spend money in fighting the Potato Beetle, the Codling Moth, or the Hessian Fly. The Government, I maintain, has done its duty with regard to the scale; and now that reliable, efficient remedies are known, the matter of controlling the pest must remain with the fruit growers. I am sure that the Government is willing to assist the fruit growers with advice and even with help when necessary.

This help should come in the form of reduction of cost of chemicals, as has been given in previous years, and in establishing a system of Township Sprayers under Governmental supervision, perhaps. To my mind the greatest need at the present time is not a new remedy, for we have efficient ones already, but an organized system of sprayers by whom every orchard can be sprayed at a reasonable cost at the proper time, and in the proper manner. Many of our smaller fruit growers have neither the outfit for doing good work, nor the time and help to spray at the proper season. They would be perfectly willing, however, to pay for the spraying of the orchards by a reliable party. In Gosfield Township, Essex County, a township sprayer was appointed last spring, and so far as I could learn from inquiries in the vicinity, the fruit growers are thoroughly satisfied with the results. A prominent grower told me that he no longer feared the scale, so long as he could get his orchard sprayed with the lime, sulphur and salt mixture, and by reliable sprayers at a reasonable cost. (See Plate 4.) A St. Catharines fruit grower thinks the McBain Carbolic Wash solves the difficulty in regard to keeping the scale in check. He thinks that there will now be no difficulty in finding good sprayers to do the work, since the wash is not disagreeable to use. He said that his own men looked upon the spraying operations with crude oil, or the whale-oil soap as a veritable ordeal.

There is another matter in regard to the scale which should be attended to as soon as possible. In the scale-infested sections there are orchards which are never sprayed. As a result they are neglected, and they form veritable breeding grounds for the scale, and other pests. I know of several orchards which are thus neglected. (Plates 2 and 3.) It is not fair to the other fruit growers that they should be exposed to such conditions.

The townships should see to it, and pass a by-law compelling the spraying of the neglected orchards, or to have them cut down and burned. The Government might very reasonably look after the inspection necessary for the proper carrying out of the by-law. We all know how such a by-law would soon become a dead letter through difficulty in getting the local authorities to carry out its provisions. An outsider can carry on the work, but a local man cannot.

Furthermore, fruit growers must recognize the necessity for at least one spraying every year. In badly infested orchards two sprayings should be made.

Finally, good spraying outfits,—a 5-ply hose—not an ordinary garden hose, should be used.

